

2001

ANNUAL REPORT



Wisconsin Transportation Research



WISCONSIN
DEPARTMENT OF
TRANSPORTATION



2001

ANNUAL REPORT

Wisconsin Transportation Research

Research, development and technology transfer activities carried out by the Wisconsin Department of Transportation and its partners.

Includes those projects funded through the State Planning and Research Program of the Federal Highway Administration.

For Federal Fiscal Year 2001—beginning October 1, 2000 and ending September 30, 2001

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Tom Carlsen

Acting Secretary

Wisconsin
Department of
Transportation



“Are we focusing on those needs most important to our customers and most likely to yield significant cost savings ...?”

Gary Whited

Administrator

Division of
Transportation
Infrastructure
Development



“I encourage all involved in research ... to consider how we can best put new technologies to work for our transportation customers.”

TARGETING RESEARCH INVESTMENTS

Research has long been a part of this department's activities. For good reason.

New paving materials and construction methods, new planning strategies, better approaches to safety—these are just a few positive results of research. Every area of a state DOT's responsibility can benefit from carefully planned and executed research.

This annual report provides an opportunity to view, in one document, the scope of our research efforts. The charts and tables identify the research projects Wisconsin is currently conducting or to which we are lending our financial support through pooled fund efforts with other states. The projects run the gamut from highly specialized laboratory and field tests to policy research with department-wide implications.

In these times of tight budgets we can also use this report to consider how well we are targeting our research investments. Are we focusing on those needs most important to our customers and most likely to yield significant cost savings and long-term improvements in quality?

These are questions for each of us, particularly for department managers and for staff and partners who give generously of their time and talent serving on research planning committees and project oversight teams.

Our reorganized research program is beginning its fourth full year of operation, with strong participation by the contracting, consulting engineering and academic communities. I applaud the dedication of all involved and your willingness to work together for common research goals.

PUTTING NEW TECHNOLOGY TO WORK

Customer surveys carried out by WisDOT and other transportation agencies around the country are clear: highway users want safe, smooth roads and they want needed repairs performed quickly, with as little delay to them as possible.

We've heard this message. We're working closely with the asphalt and concrete paving industries to test new materials and methods that shorten construction time and add years of high quality life to roadways and bridges. Wisconsin is also a leader in using innovative contracting arrangements such as warranties of pavement performance, which reward outstanding contractors while assuring better products for the public.

The technical experts in the Division of Transportation Infrastructure Development

are charged with helping deliver highway and airport projects and with maintaining the state transportation system. To do that job well, DTID staff members need research.

This research includes original work carried out by the department and its talented university and industry partners. It also includes the vast and growing body of work produced by thousands of investigators from throughout the country. Their research is becoming available to us via the Internet almost the moment it is completed.

New ideas are only the beginning of the process. Incorporating them into our everyday practices is how we get the real benefit of research. I encourage all involved in research, within the department and among our partners, to consider how we can best put new technologies to work for our transportation customers.

FOCUSING ON RESULTS

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Nine months ago the Research Coordination Section published *Foundations for the Future: Wisconsin Transportation Research 2000*. It was the department's first summary of its research activities in more than a decade.

That report summarized the costs, objectives and expected benefits of more than 70 research projects active during the previous four years. We also described our newly reorganized research programs—composed of the department's Council on Research and Technology Advancement Unit, the Wisconsin Highway Research Program partnership and the Midwest Regional University Transportation Center at UW-Madison.

With this publication, *Wisconsin Transportation Research 2001*, we narrow our focus to a traditional annual report—covering the activities of Federal Fiscal Year 2001—beginning October 1, 2000 and ending September 30, 2001.

- Pie charts on pages 4-7 show the budget and program breakdowns for FFY 2001 with estimates for the upcoming FFY 2002.
- A Gantt chart on pages 10-11 shows the progress of the 54 research projects active in FFY 2001, five of which were completed. More than two-thirds of those remaining are scheduled for completion before October 1, 2002.
- Program highlights and brief summaries of the 17 new projects planned for FFY 2002 may be found on pages 12-19.
- More detailed information on previous years' projects may be found in *Wisconsin Transportation Research 2000*, accessible on our Web site.

As projects come to completion, are evaluated by technical oversight committees and considered by management for implementation, we all have the opportunity to focus on results. With our valuable perspectives as investigators, technical committee members, research managers and depart-

ment leaders, we can contribute to an ongoing, joint effort to make Wisconsin a leader in putting research to work.

Peer Exchange in 2002

In 2002 we will continue working to improve our research efforts. As part of our participation in the FHWA State Planning and Research Program we will be conducting a "peer exchange" with research leaders from Washington, D.C. and other state DOTs. Our visitors will look at our programs and learn from us. We will in turn learn from their observations and suggestions.

Scheduled for April 9-11, 2002, the peer exchange will focus on building effective information services for transportation research—on improving the ways by which we access existing transportation research, avoid duplication, save dollars and speed implementation of research results into practice.

Our department partner in this effort is the WisDOT library, home of one of the top ten transportation collections in the country. WisDOT's professional librarians, John Cherney and Wendy Brand, are working closely with the Research Section in this and other efforts to improve research and information services.

Research Online

Current information on Wisconsin transportation research is on our Web sites. ►



Nina McLawhorn
Research Administrator
Research Coordination Section

"With our many valuable perspectives as investigators, technical committee members, research managers and department leaders, we can contribute to an ongoing, joint effort to make Wisconsin a leader in putting research to work."

On the dotnet
dotnet/dtidadmin/oas/research

On the Internet
www.dot.state.wi.us/dtid/research

Research Coordination Section Staff



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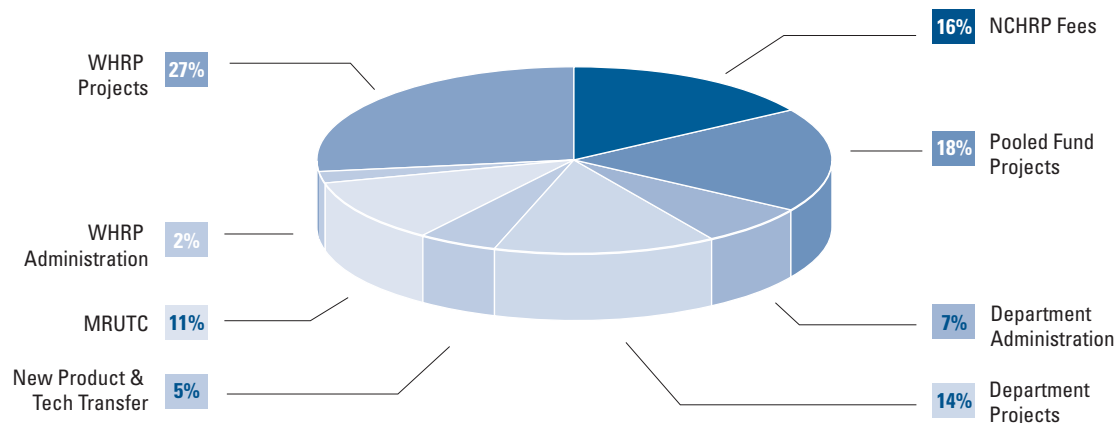
Amity Dalsoren
Program Assistant



Patrick Casey
Casey Technical Communications

FFY 2001 SPR BUDGET

\$3,935,882



Revenues

Federal Funds	\$3,454,296
State Funds	\$481,586
Total	<u>\$3,935,882</u>

Expenditures

100% Federal Funds

NCHRP Fees	\$613,950
TRB Fees	\$0
MRUTC Projects	\$200,000
Pooled Fund Projects	\$714,000
	<u>\$1,527,950</u>

80% Federal Funds/20% State Funds

Department Administration	\$262,000
Department Projects	\$532,398
New Product Testing/ Technology Transfer	\$180,306
MRUTC – DVCC	\$250,000
WHRP Administration	\$62,470
WHRP Projects	\$1,120,758
	<u>\$2,407,932</u>

Total **\$3,935,882**

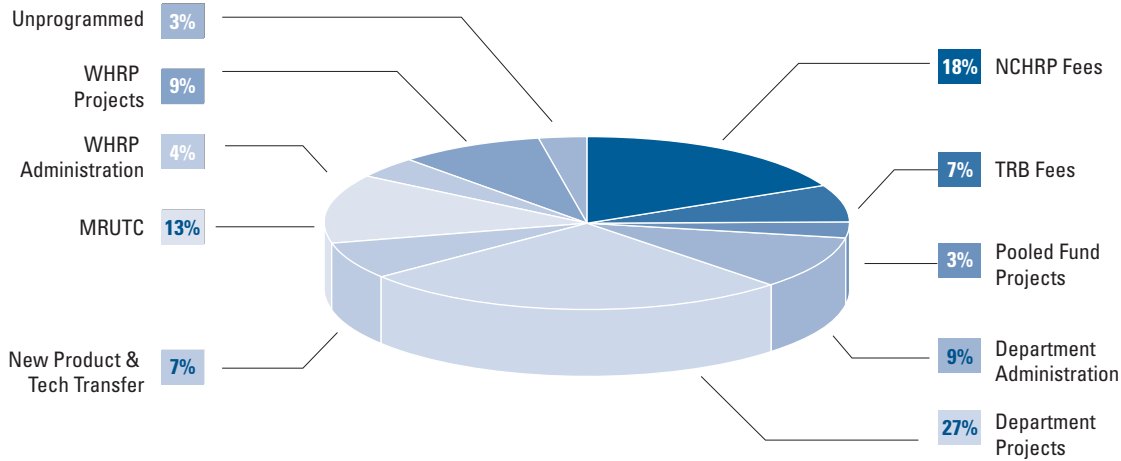
Acronyms

COR	Council on Research
DVCC	Deer-Vehicle Crash Clearinghouse
FFY	Federal Fiscal Year (10/1 through 9/30)
MRUTC	Midwest Regional University Transportation Center
NCHRP	National Cooperative Highway Research Program
SPR	State Planning and Research
TAU	Technology Advancement Unit of the Bureau of Highway Construction
TRB	Transportation Research Board
WHRP	Wisconsin Highway Research Program

FFY 2002 SPR BUDGET

\$3,394,903 (est.)

5



Estimated Revenues

Federal Funds	\$2,819,903
State Funds	\$575,000
Total	\$3,394,903

Estimated Expenditures

100% Federal Funds

NCHRP Fees	\$614,000
TRB Fees	\$221,352
Peer Exchange	\$4,000
MRUTC Projects	\$200,000
Pooled Fund Projects	\$105,000
	\$1,144,352

80% Federal Funds/20% State Funds

Department Administration	\$322,000
Department Projects	\$900,322
New Product Testing/Technology Transfer	\$220,775
MRUTC – DVCC	\$250,000
WHRP Administration	\$133,509
WHRP Projects	\$306,653
Unprogrammed Funds	\$117,292
	\$2,250,551

Total **\$3,394,903**

Notes

Five FFY 2002 WHRP projects totaling \$652,080 are using FFY 2001 funds.

TRB fees for FFY 2002 include FFY 2001 fees.

Department projects include those administered by COR and TAU.

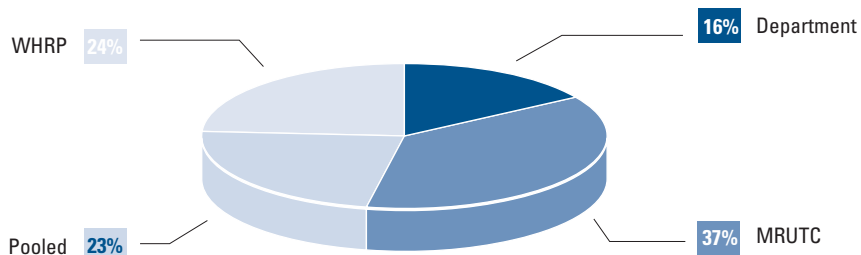
The New Product Testing/Technology Transfer program is administered by TAU.

The Wisconsin Department of Transportation is dedicated to “creating transportation solutions through innovation and exceptional service.” Effective research makes innovation possible. In order to continue improving our research efforts, we have taken as guiding principles the **Seven Keys to Building a Robust Research Program**. Published in 1999 by the National Cooperative Highway Research Program, this document (Synthesis Report 280) is a distillation of the best thoughts of DOT research managers, transportation agency administrators, industry leaders and academics from around the country regarding the attributes of robust research programs. These are the programs “that flourish and thrive, are vital and enduring, and that support the overall performance of the parent organizations.”

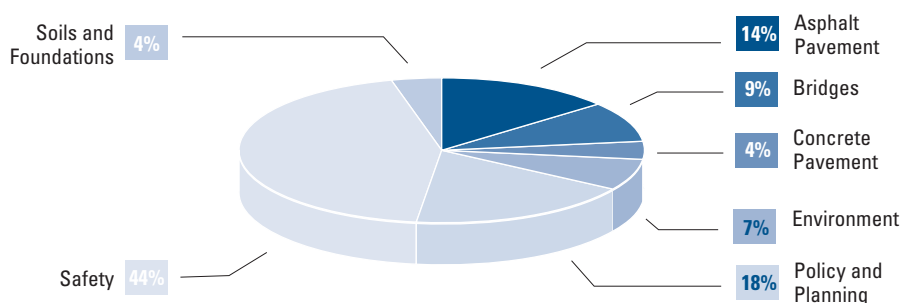
Note: The charts on pages 6-7 show research project award amounts as originally approved. Charts do not include program and administrative expenditures or NCHRP and TRB fees.

FFY 2001 PROJECT FUNDING

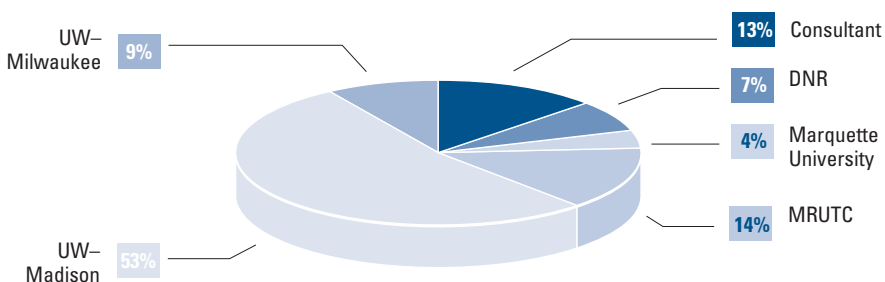
FFY 2001 Research Programs — Total Project Funding
\$1,860,316



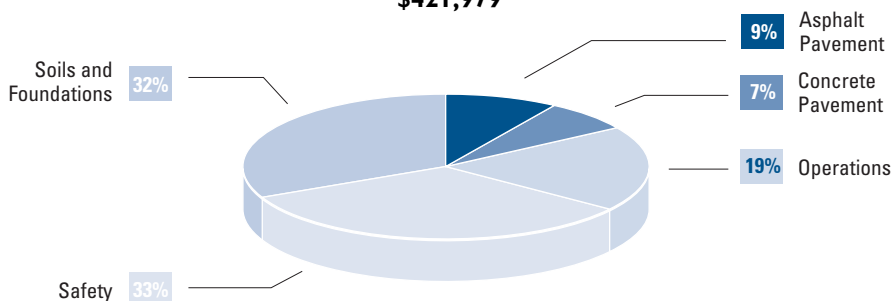
FFY 2001 Research Categories — Wisconsin Project Funding
\$1,438,337



FFY 2001 Performing Organizations — Wisconsin Project Funding
\$1,438,337



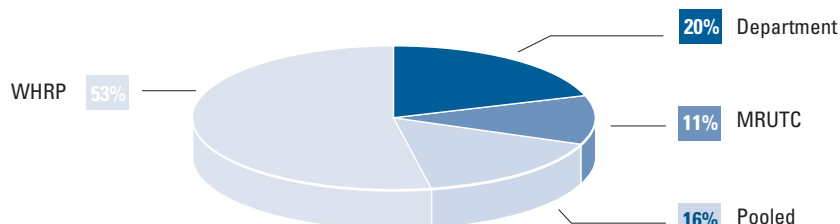
FFY 2001 Research Categories — Pooled Fund Project Funding
\$421,979



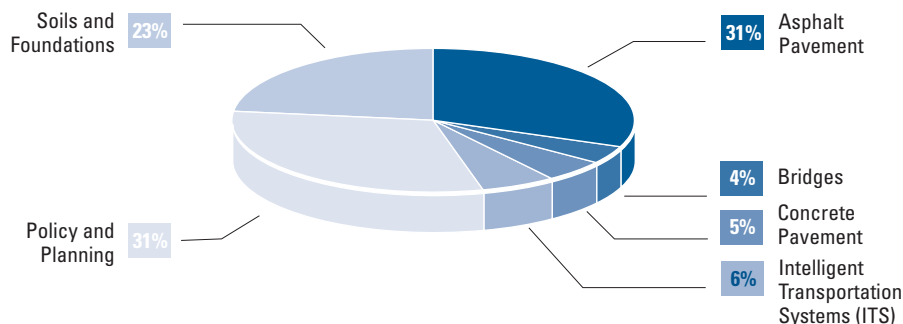
FFY 2002 PROJECT FUNDING

7

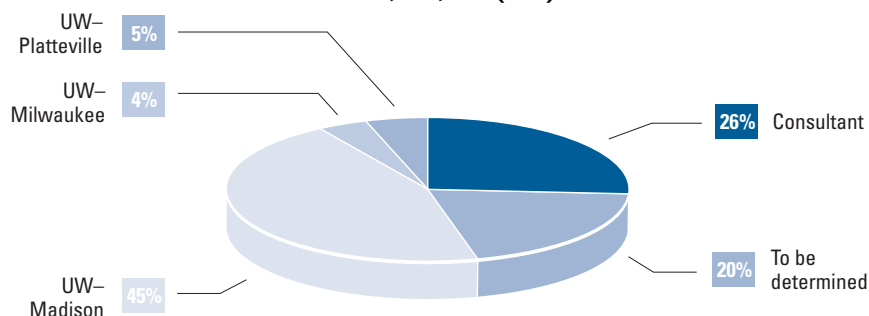
FFY 2002 Research Programs — Total Project Funding \$1,853,913 (est.)



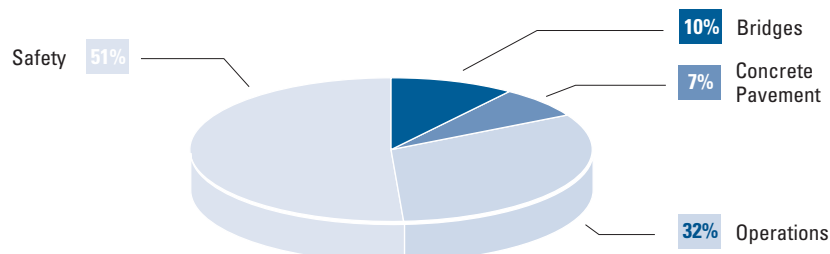
FFY 2002 Research Categories — Wisconsin Project Funding \$1,553,913 (est.)



FFY 2002 Performing Organizations — Wisconsin Project Funding \$1,553,913 (est.)



FFY 2002 Research Categories — Pooled Fund Project Funding \$300,000 (est.)



7 Keys to Building a Robust Research Program

Found it on trust. Connect research to management concerns; assure management support for research efforts.

Market boldly at every stage of the process. Sell the need for and benefits of research to sponsors and users.

Root it in economics. Identify and quantify the economic benefits of research.

Make deals unabashedly. Form partnerships to leverage resources, access expertise and enhance credibility.

Insist on accountability from researchers, managers and partners.

Embrace policy research. Address strategic needs of management.

Empower the staff. Encourage generation of new ideas.

ACTIVE POOLED FUND PROJECTS

WisDOT RD&T Web site

www.dot.state.wi.us/dtid/research

Turner-Fairbank Highway Research Center

www.tfsrc.gov/site/active.htm

Any federal, state, regional or local transportation agency may initiate a pooled fund research study to address a common problem or challenge. Participants contribute money, talent or other resources to the study, resulting in a larger effort than any one agency could have undertaken and avoiding costly duplication. WisDOT is currently participating in the pooled fund

projects identified below. Objectives and expected benefits of each project may be found in the **2000 Annual Report** available on our Web site. WisDOT contacts listed below have current project information. For additional pooled fund projects, visit the Turner-Fairbank Highway Research Center Web site at www.tfsrc.gov/site/active.htm.

Project ID	Research Category	Project Title	Total Pledge	2001 SPR Expenditure	FFY 2001 Committed	FFY 2002 Committed	WisDOT Contact
SPR-2 (211)	Asphalt Pavement	Bulk Specific Gravity Round Robin Using the Corelok Vacuum Sealing Device	\$10,000	\$10,000	\$10,000	\$0	leonard.makowski@dot.state.wi.us
SPR-3 (044)	Asphalt Pavement	Base Funding for the North Central Superpave Center	\$90,000	\$25,000	\$0	\$0	john.volker@dot.state.wi.us
SPR-3 (088)	Asphalt Pavement	Asphalt Pavement Damage Related to Tire Pressure	\$30,000	\$30,000	\$30,000	\$0	thomas.martinelli@dot.state.wi.us
TPF-5 (005)	Bridges	FHWA Curved Steel Bridge Test	\$30,000	\$30,000	\$0	\$30,000	stan.woods@dot.state.wi.us
TPG-5 (003) SPR-2 (219)	Concrete Pavement	Extending the Season for Concrete Construction and Repair	\$30,000	\$30,000	\$30,000	\$0	david.larson@dot.state.wi.us
TPF-5 (014)	Concrete Pavement	Advanced Image Analysis System for Hardened concrete	\$20,000	\$20,000	\$0	\$20,000	david.larson@dot.state.wi.us
SPR-2 (207)	Operations	USDOT FHWA Transportation Management Center	\$75,000	\$75,000	\$0	\$75,000	john.corbin@dot.state.wi.us
SPR-2 (183)	Operations	Development of Computer-Based Training Lessons for Engineers, Specialists & Technicians	\$20,000	\$20,000	\$0	\$20,000	bobbie.beson-crone@dot.state.wi.us
SPR-3 (060)	Operations	Phase IV Highway Winter Maintenance Concept Vehicle Project	\$50,000	\$50,000	\$50,000	\$0	thomas.martinelli@dot.state.wi.us
SPR-3 (104)	Operations	Computer-Based, Self-Operating Training System on Anti-Icing/Road Weather Information Systems (AI/RWIS)	\$30,000	\$30,000	\$30,000	\$0	thomas.martinelli@dot.state.wi.us
SPR-3 (071)	Policy and Planning	A New Approach to Assessing Road User Charges	\$50,000	\$40,000	\$0	\$0	robert.kranz@dot.state.wi.us
HPR-3 (017)	Safety	Midwest States Crash Testing Program	\$299,471	\$110,000	\$55,000	\$55,000	beth.cannestra@dot.state.wi.us
SPR-3 (075)	Safety	Midwest States Smart Work Zone Deployment Initiative (MWSWZDI)	\$82,979	\$100,000	\$82,979	\$100,000	thomas.notbohm@dot.state.wi.us
SPR-3 (076)	Safety	Animal-Vehicle Crash Mitigation Using Advanced Technologies	\$50,000	\$10,000	\$0	\$0	john.kinar@dot.state.wi.us
SPR-2 (212)	Soils and Foundations	Non-Nuclear Testing of Soils and Granular Bases Using the GeoGauge (Soil Stiffness Gauge)	\$24,000	\$24,000	\$24,000	\$0	robert.arndorfer@dot.state.wi.us
SPR-2 (218)	Soils and Foundations	Determining the Durability of Modular Retaining Wall Blocks	\$50,000	\$50,000	\$50,000	\$0	robert.arndorfer@dot.state.wi.us
TPF-5 (001)	Soils and Foundations	Soil Mixing Methods for Hwy Application	\$60,000	\$60,000	\$60,000	\$0	robert.arndorfer@dot.state.wi.us

Pooled Fund Projects Total Commitments

\$421,979 \$300,000

NEW WISCONSIN PROJECTS

FFY 2002

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The following projects have been selected for FFY 2002 funding by the respective research programs and their associated technical committees. Investigators were chosen based on detailed proposals and

work plans that they submitted to address problem statements. Brief descriptions of the projects may be found on pages 12-19. WisDOT contacts can provide detailed information.

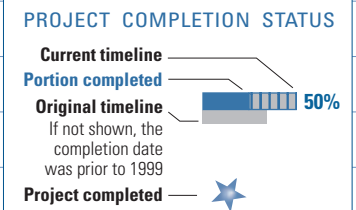


Project ID	Research Category	Project Title	Cost	Admin.	Investigator Organization	WisDOT Contact
0092-00-04	Asphalt Pavement	Minimum Pavement Thickness for Superpave Mixtures — Amendment 1	\$20,321	WHRP	UW–Madison	leonard.makowski@dot.state.wi.us
0092-02-13	Asphalt Pavement	Evaluation of Interlayer Bonding in Hot Mix Asphalt Pavements	\$49,558	WHRP	Consultant	leonard.makowski@dot.state.wi.us
0092-02-14	Asphalt Pavement	Effects of Ground Granulated Blast Furnace Slag in Portland Cement Concrete	\$194,251	WHRP	UW–Madison	leonard.makowski@dot.state.wi.us
0092-02-14	Asphalt Pavement	Effect of Pavement Lift Thickness on Superpave Mix Permeability and Density	\$225,321	WHRP	UW–Madison	leonard.makowski@dot.state.wi.us
0092-02-14	Bridges	Rapid Strengthening of Reinforced Concrete Bridges	\$59,069	WHRP	UW–Madison	stan.woods@dot.state.wi.us
0092-02-05	Concrete Pavement	Performance of Shoulders Adjacent to Concrete Pavements	\$73,467	WHRP	UW–Platteville	david.larson@dot.state.wi.us
0092-02-01	Soils and Foundations	Support Strength of Crushed Aggregate Base Course Due to Gradational, Regional and Source Variation	\$99,972	WHRP	Consultant	robert.arndorfer@dot.state.wi.us
0092-02-03	Soils and Foundations	Testing Methods to Determine Long Term Durability of Wisconsin Aggregate Resources	\$257,095	WHRP	Consultant	robert.arndorfer@dot.state.wi.us
0092-02-15	Policy and Planning	Best Practices for Linking Strategic Planning to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program	\$100,000	MRUTC	UW–Madison	nina.mclawhorn@dot.state.wi.us
0092-02-XX	Policy and Planning	Projects to be determined	\$100,000	MRUTC	UW–Madison	nina.mclawhorn@dot.state.wi.us
0092-02-07	Policy and Planning	Develop a Mechanism to Measure Customer Satisfaction With Products and Services of the Department	\$100,000	COR	Virchow, Krause and Company	john.nordbo@dot.state.wi.us
0092-02-08	Policy and Planning	Wisconsin's Off-Road Fuel-Tax Collection Process Analysis: A Midwestern Comparative Analysis and Assessment	\$64,859	COR	UW–Milwaukee	allyn.lepeska@dot.state.wi.us
0092-02-09	Policy and Planning	Vehicle Inspection and Maintenance (I/M) Programs: Literature and Best Practices Scan	\$10,000	COR	de la Torre Klausmeier Consulting, Inc	gerald.medinger@dot.state.wi.us
0092-02-10	Policy and Planning	Evaluate the Effectiveness of the Occupational Licensing Program in Terms of Providing Limited Operating Privileges to Problem Drivers and Its Impact on Highway Safety	\$100,000	COR	TBD	gary.wentz@dot.state.wi.us
0092-02-11	ITS	ITS Data Management and Archiving: Literature and Best Practices Scan	\$10,000	COR	UW–Madison	john.corbin@dot.state.wi.us
0092-02-12	ITS	Perspectives and Expectations of Drivers — Literature and Best Practices Scan	\$10,000	COR	UW–Milwaukee	john.corbin@dot.state.wi.us
0092-02-16	ITS	Development of Methods for Benefits Assessment of ITS Deployment in Wisconsin — Phase II	\$80,000	COR	TBD	phil.decabooter@dot.state.wi.us

\$1,553,913

PROGRESS OF RESEARCH PROJECTS — ACTIVE IN FFY 2001

Proj. ID	Category	Admin	Cost	Contact	Project Title	1999	2000	2001	2002	2003	2004	2005	2006	2007
0092-45-87	Asphalt Pavement	TAU	\$35,000	david.larson@dot.state.wi.us	Stone Matrix Asphalt				85%					
0092-45-52	Asphalt Pavement	TAU	\$21,000	david.larson@dot.state.wi.us	Recycling Rubber Modified Asphalt				80%					
0092-45-73	Asphalt Pavement	TAU	\$87,000	david.larson@dot.state.wi.us	Modified SHRP AC			★	100%					
0092-45-79	Concrete Pavement	TAU	\$72,556	david.larson@dot.state.wi.us	Cost Effective Concrete Pavement Cross Sections				50%					
0092-45-59	Policy	TAU	\$259,826	david.larson@dot.state.wi.us	Public Perceptions of the Midwest's Pavements			★	100%					
0092-45-81	Bridges	TAU	\$60,000	david.larson@dot.state.wi.us	Performance Based Specifications for Bridge Decks				95%					
0092-45-76	Concrete Pavement	TAU	\$113,370	david.larson@dot.state.wi.us	Strategies for Enhancing the Freeze-Thaw Durability of PCC Pavements				99%					
0092-45-86	Asphalt Pavement	TAU	\$30,000	david.larson@dot.state.wi.us	Layer Coefficients for Asphaltic Mixes			★	100%					
0092-45-91	Concrete Pavement	TAU	\$9,430	david.larson@dot.state.wi.us	Noise and Texture on PCC Pavements: Results of a Multi-State Study			★	100%					
0092-45-97	Policy & Planning	COR	\$180,000	dennis.leong@dot.state.wi.us	Transportation Investments, Economic and Land Use Goals				99%					
0092-45-96	Environment	COR	\$49,470	shirley.stathas@dot.state.wi.us	Development of Pilot Archaeological Database (PAD) for WisDOT District 3				99%					
0092-45-95	Soils & Foundations	TAU	\$159,900	debra.bishoff@dot.state.wi.us	QA/QC Subgrade Specifications Development				95%					
0092-45-82	Environment	COR	\$130,000	thomas.martinelli@dot.state.wi.us	Pollutant Loadings to Storm Water Run-off from Highways: The Impact of a Sweeping Program				90%					
0092-45-20	ITS	COR	\$40,000	phil.decabooter@dot.state.wi.us	Development of Methods for Benefits Assessment of ITS Deployment in Wisconsin			★	100%					
0092-00-20	Concrete Pavement	TAU	\$125,000	debra.bishoff@dot.state.wi.us	Investigative Study of the Italgrip System				30%					
0092-45-15	Soils & Foundations	WHRP	\$55,000	robert.arndorfer@dot.state.wi.us	Effectiveness of Geosynthetics in Stabilizing Soft Subgrades				93%					
0092-45-18	Soils & Foundations	WHRP	\$95,000	robert.arndorfer@dot.state.wi.us	Field Performance of Sub-bases Constructed with Industrial Byproducts				86%					
0092-45-19	Operations	COR	\$90,000	stan.woods@dot.state.wi.us	Design & Prototype: Automated Routing & Evaluation of Bridge Restrictions for Oversize/Overweight Permitting				95%					
0092-00-04	Asphalt Pavement	WHRP	\$45,435	leonard.makowski@dot.state.wi.us	Minimum Pavement Thickness for Superpave Mixes				71%					
0092-00-07	Concrete Pavement	WHRP	\$97,740	david.larson@dot.state.wi.us	Effects of Aggregate Coatings and Films on Concrete Performance				60%					
0092-00-12	Soils & Foundations	WHRP	\$100,616	robert.arndorfer@dot.state.wi.us	Equivalency of Subgrade Reinforcement Methods				65%					
0092-00-17	Bridges	WHRP	\$50,000	stan.woods@dot.state.wi.us	Assessment & Rehab Strategies/Guidelines to Maximize Service Life of Concrete Structures				95%					
0092-45-16	Concrete Pavement	WHRP	\$55,510	david.larson@dot.state.wi.us	Field Measurement of Water Cement Ratio for Portland Cement Concrete – Phase II				97%					
0092-45-98	Asphalt Pavement	WHRP	\$80,001	leonard.makowski@dot.state.wi.us	Field & Lab Eval. of Superpave Mixtures with Different PG Grades & Aggregate Angularity				95%					
0092-00-02	Operations	COR	\$40,000	sandra.huxtable@dot.state.wi.us	Improved Use of the Inspection Selection System (ISS) for Motor Carrier Safety				99%					
0092-00-05	Asphalt Pavement	WHRP	\$45,000	leonard.makowski@dot.state.wi.us	Development of Rational Overlay Design Procedures for Flexible Pavements				75%					



0092-00-08	Concrete Pavement	WHRP	\$75,000	david.larson@dot.state.wi.us	Wet Pavement Crash Study of Longitudinally and Transversely Tined PCC Pavements	<div><div></div></div> 25%					
0092-00-15	Bridges	WHRP	\$49,745	stan.woods@dot.state.wi.us	Non-Destructive Testing of Highway Bridge Structures and Luminaire Supports	<div><div></div></div> 88%					
0092-00-01	ITS	COR	\$190,000	laura.borth@dot.state.wi.us	Evaluation of Implementation Issues for Automatic Vehicle Locator (AVL) Systems for WI Transit Services	<div><div></div></div> 50%					
0092-00-11	Concrete Pavement	WHRP	\$39,857	david.larson@dot.state.wi.us	Portland Cement Concrete Pavement over Rubblized PCC	<div><div></div></div> 30%					
0092-00-06	Asphalt Pavement	WHRP	\$50,000	leonard.makowski@dot.state.wi.us	Determining a Temperature-Density Relationship after Completed Rolling of HMA	<div><div></div></div> 80%					
0092-00-13	Soils & Foundations	WHRP	\$99,979	robert.arndorfer@dot.state.wi.us	Investigation of Bridge Approach Settlement Mitigation	<div><div></div></div> 20%					
0092-00-16	Bridges	WHRP	\$49,969	stan.woods@dot.state.wi.us	Structural Analysis of Sign and Luminaire Support Structures	<div><div></div></div> 65%					
0092-45-14	Safety	COR	\$89,842	eileen.ostrowsky@dot.state.wi.us	Licensing the High Risk Driver	<div><div></div></div> 99%					
0092-00-03	Environment	COR	\$75,000	robert.pearson@dot.state.wi.us	Evaluation of Storm Water Treatment Technologies for Highway Runoff	<div><div></div></div> 50%					
0092-45-17	ITS	COR	\$150,000	john.corbin@dot.state.wi.us	Benefit Evaluation of Ramp Meters and Variable Message Signs in Wisconsin	<div><div></div></div> 50%					
0092-01-02	Asphalt Pavement	WHRP	\$55,337	leonard.makowski@dot.state.wi.us	Using the Gyratory Compactor to Measure the Mechanical Stability of Asphalt Mixes	<div><div></div></div> 38%					
0092-00-14	Soils & Foundations	WHRP	\$30,000	robert.arndorfer@dot.state.wi.us	Estimating Pile Setup in Wisconsin	<div><div></div></div> 75%					
0092-01-01	Asphalt Pavement	WHRP	\$99,828	leonard.makowski@dot.state.wi.us	Guidelines for Performance Graded Binder Selection	<div><div></div></div> 6%					
0092-01-03	Asphalt Pavement	WHRP	\$50,753	leonard.makowski@dot.state.wi.us	Evaluation of Extent of Hot Mix Asphalt Moisture Damage in WI as it Relates to Pavement Performance	<div><div></div></div> 58%					
0092-01-07	Policy & Planning	COR	\$60,000	connie.hultman@dot.state.wi.us	Examining Stress Levels of DSP Enforcement Personnel and Intervention Techniques	<div><div></div></div> 0%					
0092-01-06	Bridges	WHRP	\$124,968	stan.woods@dot.state.wi.us	Rehab Techniques for Concrete Bridges	<div><div></div></div> 7%					
0092-01-08	Safety	COR	\$130,000	jeffrey.knupp@dot.state.wi.us	Impact on Highway Safety of Multiple Administrative Driver License Withdrawal Systems	<div><div></div></div> 80%					
0092-01-05	Soils & Foundations	WHRP	\$58,803	robert.arndorfer@dot.state.wi.us	Evaluation of the Dynamic Cone Penetrometer & Soil Stiffness Gauge for Measuring Subgrade Stability	<div><div></div></div> 58%					
0092-01-10	Policy & Planning	MRUTC	\$50,000	bittner@engr.wisc.edu	Synthesis of National Activities in Transportation Asset Management	<div><div></div></div> 55%					
0092-01-10	Policy & Planning	MRUTC	\$50,000	bittner@engr.wisc.edu	Evaluation of Asset Mangement Practices in Private Sector Transportation-Related Organizations	<div><div></div></div> 40%					
0092-01-10	Policy & Planning	MRUTC	\$25,000	bittner@engr.wisc.edu	Asset Management Web site	<div><div></div></div> 40%					
0092-01-10	Policy & Planning	MRUTC	\$25,000	bittner@engr.wisc.edu	National Workshop on Transportation Asset Management	<div><div></div></div> 95%					
0092-01-10	Policy & Planning	MRUTC	\$50,000	bittner@engr.wisc.edu	Evaluation of Transportation Organization Outsourcing: Decision Making Criteria	<div><div></div></div> 25%					
0092-01-11	Policy & Planning	MRUTC	\$500,000	bittner@engr.wisc.edu	Deer-Vehicle Crash Clearinghouse	<div><div></div></div> 3%					
0092-01-04	Concrete Pavement	WHRP	\$58,648	david.larson@dot.state.wi.us	Early Opening of Portland Cement Concrete Pavements to Traffic	<div><div></div></div> 11%					
0092-01-09	Environment	COR	\$100,000	gary.birch@dot.state.wi.us	Fresh Water Mussel Study	<div><div></div></div> 20%					
0092-02-01	Soils & Foundations	WHRP	\$99,972	robert.arndorfer@dot.state.wi.us	Support Strength of Crushed Aggregate Base Course Due to Gradational, Regional and Source Variations	<div><div></div></div> 0%					
0092-02-05	Concrete Pavement	WHRP	\$73,467	david.larson@dot.state.wi.us	Performance of Shoulders Adjacent to Concrete Pavements	<div><div></div></div> 0%					

NOTES:

Years shown are Federal Fiscal Years: October 1 through September 30.

Timelines are current as of September 30, 2001.

Funds are WisDOT. Projects with bold ID numbers also have additional funds from other agencies.

During FFY 2001, fifteen new projects were begun and five were completed.

Thirty-four projects are currently scheduled to be completed by September 30, 2002.



COUNCIL ON RESEARCH

The Council on Research (COR), composed of representatives from WisDOT's divisions and offices, works with the Research Coordination Section to select research proposals in areas such as policy and planning, operations, safety, transit and environment.

Mission

Guide, promote, prioritize and evaluate WisDOT's research, development and technology transfer (RD&T) activities as tools for achieving departmental goals.

Guiding Principles

Provide input and a department-wide perspective to the work of the Research Coordination Section. ■ Promote, prioritize and evaluate department RD&T activities. ■ Help to nurture a learning environment for WisDOT employees that will lead to increased awareness, and use, of existing research and best practices; effective analysis of research data and trends; use of the most appropriate and cost-effective contracting options; and clear communication of research results.

Measuring Customer Satisfaction

Project 0092-02-07

*Scheduled for completion
by July 31, 2002*



This project is aimed at developing a method or tool that WisDOT can regularly use to measure the satisfaction of Wisconsin travelers with the performance of the department. The long-term goal is to better understand customer satisfaction trends across various demographic groups and provide WisDOT decision-makers with a consistent, reliable source of information for making informed decisions, including recommendations to the Legislature.

WisDOT's expected outcomes for the mechanism(s) put in place as a result of this project are:

- 1) customers who are very satisfied with the mix of products and services that WisDOT offers;
- 2) a continual high level of confidence in the validity and accuracy of our measures of customers' satisfaction levels.

Phase 1: Analysis of existing WisDOT customer satisfaction measures, data-collection mechanisms, analytical methods and decision-making processes.

Deliverable: A profile and plan.

Phase 2: Identification of best practices nationwide related to effective customer satisfaction measures, customer segmentation strategies, data-collection mechanisms and analytical methods.

Deliverable: Summary and recommendations.

Phase 3: Development of customer satisfaction measures, data-collection mechanisms and an analysis framework appropriate for WisDOT use.

Deliverables: Pilot-tested data collection mechanism(s); data analysis and reporting plan; recommended survey administration software and data analysis software, if any.

COUNCIL ON RESEARCH

New Projects — FFY 2002



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0092-02-07

Develop a Mechanism to Measure Customer Satisfaction with Products and Services of the Department

This multi-divisional research effort will result in specific measures of performance in the area of customer satisfaction. The long-term goal is to better understand customer satisfaction trends and provide state government decision makers with a consistent, reliable source of information to make informed decisions.

0092-02-08

Wisconsin's Off-Road Fuel Tax Collection Process: A Midwestern Comparative Analysis and Assessment

The goal of this study is to review current off-road user assessment, collection, audit and enforcement procedures in Wisconsin and its bordering states, and to develop recommendations to improve the Wisconsin system.

0092-02-09

Vehicle Inspection and Maintenance (I/M) Programs: A Literature and Best Practices Scan

Future improvements in motor vehicles and fuels will reduce the air-quality benefits associated with traditional I/M programs. At the same time, new emission test methods may become available. This research will examine how WisDOT can utilize upcoming technological changes and test methods to maximize emission benefits, efficiency and public acceptance. This research project will assemble existing information and recommend next research steps.

0092-02-10

Evaluate the Effectiveness of the Occupational Licensing Program in Terms of Providing Limited Operating Privileges to Problem Drivers and Its Impact on Highway Safety

The occupational (hardship) license in Wisconsin is intended to provide limited operating privileges to drivers who have had their licenses suspended or revoked. This effort will document data on the program's positive and negative effects.

0092-02-11

ITS Data Management and Archiving: A Literature and Best Practices Scan

Effective management and archiving of traffic data collected by ITS deployments are important for evaluating ITS effectiveness and for potential public-private partnerships in the future. This project will scan for best practices and critical information nationally; analyze promising approaches, identify gaps in understanding and recommend next research steps.

0092-02-12

Perspectives and Expectations of Drivers: A Literature and Best Practices Scan

ITS strategies are constrained, in part, by driver acceptance. This project will help determine how drivers perceive, interpret and respond to various ITS systems. This project will scan for best practices and critical information nationally; analyze promising approaches, identify gaps in understanding and recommend next research steps.

0092-02-16

Development of Methods for Benefits Assessment of ITS Deployment in Wisconsin—Phase II

As WisDOT moves toward developing specific ITS design criteria, more detailed benefit/cost analysis tools will be required to enable engineers and other practitioners to make quantitative, data-based decisions comparing one type of solution to another. This study will use Wisconsin-based case study analyses to help decide what approaches to employ to optimize use of resources to solve congestion and safety problems.

See page 9 for project funding details and contact names.

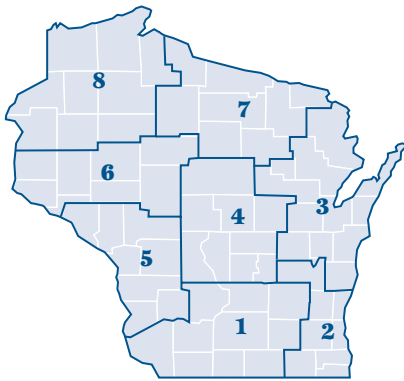


TECHNOLOGY ADVANCEMENT UNIT

The Technology Advancement Unit (TAU) is part of the Pavements Section of WisDOT's Bureau of Highway Construction (BHC) in the Division of Transportation Infrastructure Development (DTID). Located at the Truax Center, TAU's mission is to support WisDOT strategic directions by addressing both existing and anticipated future needs of Wisconsin's transportation system. TAU's responsibilities are concentrated in pavement studies and evaluations, technology advancement and new products.

TAU engineers coordinate WisDOT participation in the following national research and technology transfer programs:

- National Transportation Product Evaluation Program (NTPEP)
- Highway Innovative Technology Evaluation Center (HITEC)
- Special Pavements Studies (SPS)
- Federal Experimental Projects Program

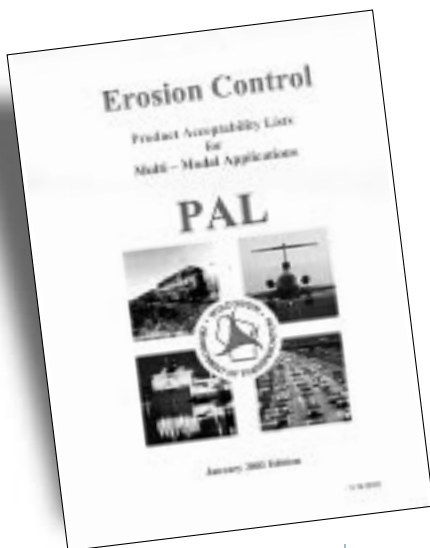


Technology Advancement Steering Committee (TASC)

The Technology Advancement Steering Committee provides a forum for two-way communication between TAU and representatives from the eight district offices in the Division of Transportation Districts and from other DTID bureaus.

At formal meetings several times a year, district and bureau personnel are able to bring technical problems and needs to TAU staff. Conversely, TAU is able to provide them with the latest in technology transfer and give status reports on studies that are under way. More than 70 studies are currently active on a wide range of transportation topics.

The focus of the Steering Committee and one of the primary roles of TAU itself, is meeting the immediate needs of the districts in technology transfer and early distress investigations.



Erosion Control Product Acceptability List (PAL)

The Erosion Control Product Acceptability List, available on the Internet at www.dot.state.wi.us/dtid/bhc/pdf/pal.pdf, is published annually, with semiannual updates, by a subcommittee of WisDOT's Erosion Control Storm Water Committee. The PAL Subcommittee, chaired by a TAU engineer, is responsible for compiling this approved list of erosion control products along with specifications complementing Wisconsin's standard specifications.

The PAL provides guidance in proper use of erosion and sediment control products, such as erosion mats, soil stabilizers, tackifiers, inlet protection and temporary ditch checks. Approval of products is based on testing or review of test data for adherence to WisDOT standards.

TECHNOLOGY ADVANCEMENT UNIT

50-Year Pavements

The WisDOT Pavements Section is working closely with contractors in both the asphalt and concrete paving industries to test new, longer lasting designs. On heavily traveled roadways these new pavement types may be the best way to “get in, get out, and stay out.”

The asphalt industry calls its long-life design Perpetual Pavement, a permanent installation that renders the remove-and-replace option virtually obsolete. WisDOT recently installed several test sections of Perpetual Pavement on WIS 50 in Walworth County, with plans for additional sections at an I-94 truck weigh station. Performance data for projected life span will be collected and evaluated during the next five years.

The concrete industry calls its long-life design High Performance Concrete Pavement (HPCP), incorporating such technologies as stainless steel dowel bars and tie

bars, underdrain, deep base and additional thickness—all contributing to very long life and very low maintenance. WisDOT recently received FHWA funds to build a HPCP test section on I-90 in Monroe County that will be carefully measured to derive estimates of service life.



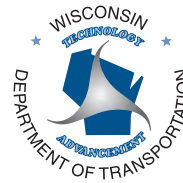
RED Reports

TAU engineers are frequently called on to carry out investigations of unanticipated pavement problems or distress. A Report on Early Distress (or RED Report) is prepared to document the problem, investigate possible causes and recommend potential solutions.

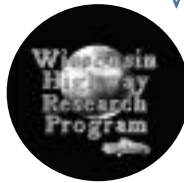
A recent RED Report on retrofit dowel bars, for example, was initiated in February 2001 to investigate early distress for a retrofit dowel bar (RDB) project constructed from 1999-2000 on I-39 in central Wisconsin. RDB is a concrete pavement rehabilitation technique used to correct faulting and improve load transfer between adjacent concrete slabs, thereby extending service life.

In this case, significant portions of the RDB work were showing early distress in the form of deterioration of the mortar material in the dowel bar slots. As a result of the distress on this and other RDB projects, a statewide moratorium on use of the technique was issued (Spring of 2001) until more knowledge is gained on its long-term viability.

This report, RED-05-01, describes the findings of the investigation along with recommendations and an implementation plan to address the problems. The primary cause of the distress was found to be poor freeze/thaw durability of the mortar material, apparently leading to secondary spalling at the joints of the original concrete.



WISCONSIN HIGHWAY RESEARCH PROGRAM



WHRP Web site
www.whrp.org

Investigators contracted through the Wisconsin Highway Research Program (WHRP) carry out materials and construction research for WisDOT in the areas of rigid and flexible pavements, geotechnics and structures. Research projects in each of these areas is overseen by a technical oversight committee, chaired by a member of WisDOT's staff, with additional members from the Federal Highway Administration, industry and academia. Overall policy direction for the

WHRP is provided by a steering committee, chaired by WisDOT's Administrator of the Division of Transportation Infrastructure Development.

UW-Madison's College of Civil and Environmental Engineering is contracted to administer the WHRP program. An annual report of progress is available on the WHRP Web site at www.whrp.org.

Structural Analysis of Sign and Luminaire Support Structures

Project 0092-00-16

*Scheduled for completion
by June 1, 2002*



This project will investigate failures of luminaire supports and poor in-service performance of overhead sign support structures. Possible causes and solutions will be documented, and retrofit strategies will be evaluated for effectiveness. The research will result in inspection criteria and performance prediction methods for WisDOT to use in its maintenance program for these structures.

¹ WisDOT contracts with UW-Madison to administer the WHRP, funding four research projects plus administrative costs.

² WHRP funds the costs of projects over multiple fiscal years.

³ WHRP shifts to funding the entire cost of each project in a single fiscal year. Fewer dollars are directed to FFY 2001 projects in order to balance previous year's commitments.

⁴ Includes seven new projects plus a \$20,341 amendment to Project 0092-00-04.

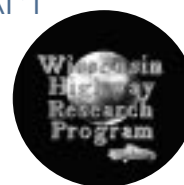
⁵ Two FFY 2002 projects are not yet contracted: 0092-02-03 Long Term Durability of Wisconsin Aggregate (\$257,095) and 0092-02-13 Evaluation of Interlayer Bonding in Hot Mix Asphalt Pavements (\$49,558).

SUMMARY OF WISDOT FUNDING TO WHRP

FFY	Annual WisDOT Commitment	Steering Committee Awards			Contracted Amounts
		Projects	Admin	Total	
1999 ¹	\$410,511	\$285,511	\$125,000	\$410,511	\$410,511
2000 ²	\$500,000	\$709,131	\$125,000	\$834,131	\$838,341
2001 ³	\$750,000	\$449,792	\$62,470	\$512,262	\$510,080
2002 ⁴	\$1,000,000	\$979,074	\$133,509	\$1,112,583	\$805,930 ⁵
Total	\$2,660,511			\$2,869,487	\$2,564,862

WISCONSIN HIGHWAY RESEARCH PROGRAM

New Projects — FFY 2002



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0092-00-04

Minimum Pavement Thickness for Superpave Mixtures — Amendment I

Additional funds were awarded to this project, begun in FFY 2000, to permit final field-testing. The research objective is to determine the minimum pavement thickness required when using various Superpave asphalt mixes.

0092-02-13

Evaluation of Interlayer Bonding in Hot Mix Asphalt Pavements

Investigator will examine the causes and potential solutions for localized pavement sliding or shoving that has been observed on some WisDOT projects during and after construction.

0092-02-14a

Effects of Ground Granulated Blast Furnace Slag in Portland Cement Concrete

The objective is to document recent Wisconsin paving projects using GGBFS and correlate physical and chemical characteristics of the material with observed performance. Variables to be quantified include temperature while curing, cement brand, air void characteristics, scaling and cement replacement levels. Application guidelines will be proposed for WisDOT.

0092-02-14b

Rapid Strengthening of Reinforced Concrete Bridges

Fiber reinforced plastic (FRP) strips will be attached to the underside of an existing concrete bridge near the end of its useful life. Load testing before and after application of the FRP strips will be carried out to determine strengthening effects. Results will be used to evaluate the potential of the method for future rehabilitation of older bridges.

0092-02-14c

Effect of Pavement Lift Thickness on Superpave Mix Permeability and Density

This research will determine the influence of pavement thickness and gradation, aggregate source, and nominal maximum size aggregate on the permeability and density of Wisconsin Superpave mixes.

0092-02-05

Performance of Shoulders Adjacent to Concrete Pavements

Through a review and analysis of existing Wisconsin pavements and shoulders, the investigator will develop guidelines for design and construction of shoulders adjacent to concrete pavements to achieve optimum performance and cost effectiveness.

0092-02-01

Support Strength of Crushed Aggregate Base Course Due to Gradational, Regional and Source Variation

Approximately 10 million tons of crushed aggregate base course (CABC) are used annually in Wisconsin in highway construction. The purpose of the research is to determine load-carrying effects related to CABC variables such as gradation, angularity and stone type found in various sand and gravel deposits and stone quarries throughout Wisconsin.

0092-02-03

Testing Methods to Determine Long Term Durability of Wisconsin Aggregate Resources Including Natural Materials, Industrial By-Products and Recycled/Reclaimed Materials

The project objective is to develop an aggregate durability test protocol for all Wisconsin aggregate types (including natural and recycled materials for both asphalt and Portland cement concrete). Effective aggregate durability tests will be identified and evaluated.

See page 9 for project funding details and contact names.



MIDWEST REGIONAL UNIVERSITY TRANSPORTATION CENTER (MRUTC)

MRTUC Web site

www.mrutc.org

WisDOT RD&T Web site

www.dot.state.wi.us/dtid/research

The Midwest Regional University Transportation Center is a consortium of eight midwestern universities, led by the University of Wisconsin-Madison. Dedicated to the complementary goals of research, education and technology transfer, the MRUTC focuses on issues related to transportation asset management. WisDOT contributes partial funding to its operation and works closely with the center in a variety of ways.

An annual report of progress with details on MRUTC activities is on its Web site. Descriptions of previous years' WisDOT-funded MRUTC research projects are published in the *2000 Annual Report* and on the WisDOT Web site. Key MRUTC projects nearing completion are summarized here.

National Transportation Asset Management Workshop

Taking the Next Step in Asset Management was the focus of the 4th National Transportation Asset Management Workshop, held September 23-25, 2001, in Madison, Wisconsin.

This workshop, hosted by the MRUTC and co-sponsored by FHWA, AASHTO and others, was open for the first time to county and municipal officials, academic researchers, consultants and transit agency professionals, as well as to state DOT and federal officials.

Over 260 people from across the country and from Britain and Canada attended the two-day program. Presentations and workshop sessions addressed key asset management issues and facilitated interaction across modes and agency types.

Keynote speakers US Representative Tom Petri and Dane County Executive Kathleen Falk were among more than 50 presenters and panelists.

Synthesis of National Activities in Transportation Asset Management

Scheduled for completion in May 2002

This project will summarize and synthesize the many national efforts related to asset management and identify gaps in the research and/or literature that need to be filled.

Information will be collected from a wide variety of transportation and public works organizations, including but not limited to: the American Association of State Highway and Transportation Officials, (AASHTO) Task Force on Asset Manage-

ment, the Transportation Research Board (TRB), the National Research and Technology Forum, the American Society of Civil Engineers' Civil Engineering Research Foundation (CERF), the Federal Highway Administration Office

of Asset Management, the U.S. Army, the Midwest Transportation Consortium, the American Public Works Association (APWA), and individual state efforts in Virginia, Colorado and the District of Columbia.

Expected project benefits include an organized, comprehensive resource for ongoing efforts related to transportation asset management that will save time identifying resources, reduce duplication, and accelerate optimization of investments and operations.



MIDWEST REGIONAL UNIVERSITY TRANSPORTATION CENTER



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WisDOT SPR funding supports the following MRUTC efforts for FFY 2002:

0092-02-15

Best Practices for Linking Strategic Planning to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program

This project will integrate successful strategic planning and performance measurements found in DOT asset management programs. A summary of best practices and performance metrics for strategic planning will be developed along with a guidebook and model process.

An internship program established by WisDOT's Division of Transportation Infrastructure Development (DTID) with the MRUTC currently has three students participating in it, doing work in the areas of engineering and public policy.

The objectives of the program are:

- 1) Provide undergraduate and graduate students, as part of their academic program, with the opportunity to receive meaningful work experiences in the field of transportation and public sector organizations.
- 2) Provide undergraduate and graduate students and WisDOT with long-term professionally rewarding relationships.
- 3) Provide WisDOT and the transportation industry access to competently trained individuals.
- 4) Assist WisDOT in completing projects and work assignments.
- 5) Establish and maintain WisDOT-University of Wisconsin-Madison partnership.

WisDOT Intern Program



This project, supported by \$500,000 in WisDOT SPR funding, utilizes UW-Madison faculty and students to initiate formation of a Deer-Vehicle Crash (DVC) Clearinghouse.

Participating states with members on the Clearinghouse Technical Advisory Committee include Wisconsin, Michigan, Minnesota, Iowa and Illinois.

Project objectives include:

- evaluation and distribution of existing research on reducing deer-vehicle crashes
- identification and distribution of DVC data collection methods in the region
- development of a standardized data collection approach
- creation of an Internet DVC Clearinghouse Web site to document research results, best practices and other regional developments
- analysis, synthesis and publication of DVC data and countermeasure research
- promotion of the Clearinghouse as the entity of choice and primary location for information exchange and education about deer-vehicle collision reduction.

Deer-Vehicle Crash Clearinghouse

Wisconsin Highway Research Program

Flexible Pavement Technical Oversight Committee

Tom Amon, B.R. Amon and Sons
Tom Brokaw, WisDOT
Hussain Bahia, UW-Madison
Jim Crovetti, Marquette University
Erv Dukatz, Mathy Construction
Len Makowski, WisDOT, Chair
Judie Ryan, WisDOT
Bob Schmitt, UW-Platteville
Wes Shemwell, Federal Highway Administration
Jack Weigel, Payne and Dolan

Wisconsin Highway Research Program

Rigid Pavement Technical Oversight Committee

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Bill Cape, James Cape & Sons Co.
Steve Cramer, UW-Madison
David Larson, WisDOT, Chair
Tom Lorfeld, WisDOT
Mike Maples, Vinton Construction Co.
Kevin McMullen, Wisconsin Concrete Pavement Association
Jim Parry, WisDOT
Bob Serak, WisDOT
Wes Shemwell, Federal Highway Administration
Tom Wenzel, Marquette University

Wisconsin Highway Research Program

GeoTechnics Technical Oversight Committee

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Eric Bahner, STS Consultants
Tuncer Edil, UW-Madison
Ken Hanzel, WisDOT
Sam Helwany, UW-Milwaukee
Harry Lindberg, Wisconsin Earth Movers Association
Tom Strock, Federal Highway Administration

Wisconsin Highway Research Program

Structures Technical Oversight Committee

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Dave Bechthold, Zenith Tech, Inc.
Ed Fitzgerald, WisDOT
Chris Foley, Marquette University
Al Ghorbanpoor, UW-Milwaukee
Mike Hanson, Lunda Construction Company
Mike Pheifer, Pheifer Brothers Construction
Tom Strock, Federal Highway Administration
Stan Woods, WisDOT, Chair
Bob Wysocki, HNTB Corporation



WisDOT & PARTNER COMMITTEES

WisDOT Council on Research

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 Rod Clark, Division of Transportation Investment Management
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 Joe Maassen, Executive Offices
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 Alan Rommel, Division of Transportation Districts
 Jeff Western, WisDOT Division of Business Management

WisDOT Technology Advancement Unit

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 Peter Kemp, New Products Engineer
 Khader Abu-Al-eis, Technology Advancement Engineer
 Steve Krebs, Pavements Section Chief
 David Larson, Technology Advancement Supervisor
 Joe Wilson, Technology Advancement Specialist

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 Patrick Casey, Casey Technical Communications
 Mark Chandler, FHWA Technology Transfer Engineer
 John Cherney, Head Librarian
 Amity Dalsoren, Research Coordination Section
 Nina McLawhorn, Research Administrator
 Rob Miller, Office of Public Affairs
 Jean Trumpy, District 2 Librarian

Midwest Regional University Transportation Center

Teresa Adams, Associate Director
 Jason Bittner, Program Manager
 Howard Rosen, Continuing Education Director
 Jeffrey S. Russell, Principal Investigator
 Aileen Switzer, Research Manager
 Ernie Wittwer, Director

Wisconsin Highway Research Program

Peter Bosscher, Director
 Aileen Switzer, Program Manager

Wisconsin Highway Research Program

Steering Committee

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 Don Gutkowski, WisDOT
 Dwight McComb, Federal Highway Administration
 Kevin McMullen, Wisconsin Concrete Pavement Association
 Mike Paddock, Wisconsin Association of Consulting Engineers
 Habib Tabatabai, UW-Milwaukee
 Gerry Waelti, Wisconsin Asphalt Pavement Association
 Tom Walker, Wisconsin Transportation Builders Association
 Gary Whited, WisDOT, Chair





Wisconsin Department of Transportation

Research Coordination Section

Wisconsin Department of Transportation

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www.dot.state.wi.us/dtid/research